CLAIMS

What is claimed is:

1. A flash memory cell comprising:

a substrate comprising a source and a drain;

a gate element; and

a dielectric layer between said substrate and said gate element, said dielectric layer comprising a dielectric material having a dielectric constant greater than that of silicon dioxide.

2. The flash memory cell of Claim 1 further comprising a layer comprising interfacing material between said dielectric layer and said substrate.

3. The flash memory cell of Claim 2 wherein said interfacing material is selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate.

4. The flash memory cell of Claim 1 further comprising a layer comprising interfacing material between said dielectric layer and said gate element.

5. The flash memory cell of Claim 4 wherein said interfacing material is selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate.

6. The flash memory cell of Claim 1 wherein said dielectric layer further comprises a first layer comprising a first interfacing material and a second layer comprising a second interfacing material, wherein said dielectric material is layered between said first and second layers.

7. The flash memory cell of Claim 1 wherein said dielectric material comprises a metal oxide.

8. The flash memory cell of Claim 1 wherein said dielectric layer comprises a composite of a metal oxide and a material selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate.

9. The flash memory cell of Claim 1 wherein said substrate comprises silicon and wherein said gate element comprises a stacked gate structure comprising a floating gate, a control gate, and an oxide-nitride-oxide layer between said floating gate and said control gate.

10. A flash memory array comprising memory cells, wherein a memory cell comprises:

a substrate comprising a source and a drain;

a gate element; and

a tunnel oxide layer between said substrate and said gate element, said tunnel oxide layer comprising a dielectric material having a dielectric constant greater than that of silicon dioxide.

11. The flash memory array of Claim 10 wherein said tunnel oxide layer further comprises a first layer comprising a first interfacing material and a second layer comprising a second interfacing material, wherein said dielectric material is layered between said first and second layers.

12. The flash memory array of Claim 11 wherein said first interfacing material and said second interfacing material are selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate.

13. The flash memory array of Claim 10 wherein said dielectric material comprises a metal oxide.

14. The flash memory array of Claim 10 wherein said tunnel oxide layer comprises a composite of a metal oxide and a material selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate.

15. A method of forming a flash memory cell, said method comprising:
forming a source region and a drain region at a location in a substrate;
forming a tunnel oxide layer at said location, said tunnel oxide layer comprising a dielectric material having a dielectric constant greater than that of silicon dioxide; and
forming a gate element at said location.

16. The method of Claim 15 wherein said forming of said tunnel oxide layer further comprises:
producing a first layer comprising a first interfacing material; and
depositing said dielectric material.

17. The method of Claim 16 wherein said forming of said tunnel oxide layer further comprises:
depositing a second layer comprising a second interfacing material, wherein said dielectric material is layered between said first and second layers.

18. The method of Claim 17 wherein said first interfacing material and said second interfacing material are selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate.

19. The method of Claim 15 wherein said dielectric material comprises a metal oxide.

20. The method of Claim 15 wherein said tunnel oxide layer comprises a composite of a metal oxide and a material selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate.